

Work Order ID: 51889

Tuesday, September 08, 2009 3:26:04 PM

Page 1

Item ID: D350-748-101

Accept

Setup Start

Revision ID: DE & 10.01.12

Stop

Item Name: Crosstube Installation, High Fwd

Start Date: 9/9/2009 Start Qty: 1.00

Cust Item ID:

Required Date: 9/29/2009 Req'd Qty: 1.00

Customer:

Reference:

Approvals:

Process Plan:

Date: 09-9-08

Tooling:

Date:

QC:

Date:

SPC (Y/N):

Date:

Run

Start

Stop

Sequence ID/
Work Center ID

Operation
Description

Set Up/
Run Hours

Draw
Number

Draw
Rev.

Plan
Code

Accept
Qty

Reject
Qty

Reject
Number

Insp.
Stamp

Draw Nbr

Revision Nbr

N/A

Rev D

100

0.00



DOCUMENT CONTROL

DC

Memo

0.00

Document Control

Photocopy bluefile & type labels per PPPD350-748-101

CHG001

SCRAP

110

0.00



BENDING MACHINE - CROSSTUBES

CNC Bend 1

Memo

0.00

CNC Delta 100 Bender

Bend tube as per Dwg D350-748-141 using CNC bender program D350F and Folio FT

(14) Q MB 10-01-13

120

QC15- Crosstube Dimensional Check

0.00



QC

Memo

0.00

Quality Control

Q 10.01.13

Work Order ID 51889

Tuesday, September 08, 2009 3:26:04 PM



Page 2

Item ID: D350-748-101

Accept



Setup Start



Revision ID: D

Stop



Item Name: Crosstube Installation, High Fwd

Start Date: 9/9/2009 Start Qty: 1.00



Cust Item ID:

Required Date: 9/29/2009 Req'd Qty: 1.00

Customer:

Reference:

Run Start



Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____

Stop



QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Draw Number	Draw Rev.	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
--------------------------------	--------------------------	----------------------	----------------	--------------	--------------	---------------	---------------	------------------	----------------

130

0.00



Crosstubes

Crosstubes

Memo

0.00

1-Drill Tube as per Dwg D350-748-141 Using DT8876 A,B & C Drill Jigs,
Set-up drill table as per QSI 010

2-Deburr

3-Engrave Part # and Batch # as per Dwg D350-748-141

4-Remove all marks from tube within limits of D350-748-141

5- Apply a light coat of LPS3 on the interior of tube

Batch: 109956

AWM 10-1-28

140



QC

Quality Control

QC5- Inspect part completeness to step on W/O

0.00

Batch engraved

Memo

0.00

Salazar

CHECK 10 DEG HOLES WITH DT8876E (EUROCOPTER CLAMP)

SCRAP

Work Order ID 51889

Tuesday, September 08, 2009 3:26:04 PM

Page 3

Item ID: D350-748-101

Accept

Revision ID: D

Item Name: Crosstube Installation, High Fwd

Start Date: 9/9/2009 Start Qty: 1.00

Required Date: 9/29/2009 Req'd Qty: 1.00

Reference:

Cust Item ID:

Customer:

Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____

QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Run Start

Stop

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Draw Number	Draw Rev.	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
--------------------------------	--------------------------	----------------------	----------------	--------------	--------------	---------------	---------------	------------------	----------------

150

Outsource process-Cadplate per QSI017 4.1.9.1

0.00



Outsource3

Memo

0.00

Outsource process - Cad plate

Issue P/O: 11282
Stress relief at 375° for 5 hours
Magnetic Particle Inspect per ASTM E1444
Cadium Plate per AMS-QQ-P-416B, Class 1, Type 2
Embrittle relief at 375° for 8 hours, Chromate Treat
Possible Supplier: Southwest United Industries
Ensure Certificate of Conformity is attached

PS 10-2-01

160

Receive & Inspect for Damage & Mat'l Certs

0.00



Packaging

Memo

0.00

Packaging

Ensure certificate of conformity is attached

170

QC5- Inspect part completeness to step on W/O

0.00



QC

Memo

0.00



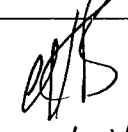

Quality Control

SCRAPPS

last page

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: D350-748-101 PAR #: NCR 10-026 Fault Category: Crosstubes NCR: Yes No DQA: / Date: 10.04.21
 Resolution: Scrap Disposition: Scrap QA: N/C Closed: / Date: /

NCR: 51889		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			
10.04.21	150	X-tube broke during stress relief. discontinuing @ end of path. For Root cause, please see NCR 10-026	 10/04/21	tube is scrap & send for inspection on NCR 10-026	N/A	 10.04.21	 10/04/21	 10.04.21

NOTE: Date & initial all entries

Plus-Ping

Hertie

Work Order ID 51889

Tuesday, September 08, 2009 3:26:04 PM



Page 4

Item ID: D350-748-101

Accept



Setup Start



Revision ID: D

Stop



Item Name: Crosstube Installation, High Fwd

Start Date: 9/9/2009 Start Qty: 1.00



Cust Item ID:

Required Date: 9/29/2009 Req'd Qty: 1.00



Customer:

Reference:

Run Start



Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____

Stop



QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Draw Number	Draw Rev.	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
180 	SprayPaint	0.00							
SprayPaint	Memo	0.00							
Spray Painting	1-Prime inside crosstube as per QSI 005 42 2-Prime Outside of Tube as per Dwg D350-748-141								
190 	QC14- Inspect Spray Paint	0.00							
QC	Memo	0.00							
Quality Control	Then, Wrap in plastic bag to protect from scratches								
200 	Crosstubes	0.00							
Crosstubes	Memo	0.00							
Crosstubes	1-Install Ground wire Insert, then insert screw and washer 2-Install Abrasion strips as per Dwg D350-748-141 & QSI 035. 3-Install supports Using Dt8876 as per Dwg D350-748-141, Torque to 60-80 IN-LBS								

Work Order ID 51889

Tuesday, September 08, 2009 3:26:04 PM



Page 5

Item ID: D350-748-101

Accept



Setup Start



Revision ID: D

Stop



Item Name: Crosstube Installation, High Fwd

Start Date: 9/9/2009 Start Qty: 1.00



Cust Item ID:

Required Date: 9/29/2009 Req'd Qty: 1.00



Customer:

Reference:

Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____

Run Start



QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Stop



Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Draw Number	Draw Rev.	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
210 QC Quality Control	QC5- Inspect part completeness to step on W/O Memo	0.00 0.00							
220 Packaging Packaging	Pick Kit Memo	0.00 0.00							
230 QC Quality Control	QC4- 100% Inspect kits for completeness Memo	0.00 0.00							

SCRAP

Work Order ID 51889

Tuesday, September 08, 2009 3:26:04 PM



Page 6

Item ID: D350-748-101

Accept



Setup Start



Revision ID: D

Stop



Item Name: Crosstube Installation, High Fwd

Start Date: 9/9/2009 Start Qty: 1.00



Cust Item ID:

Required Date: 9/29/2009 Req'd Qty: 1.00



Customer:

Reference:

Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____

Run Start



QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Stop



Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Draw Number	Draw Rev.	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
240 	Packaging	0.00							
Packaging	Memo Identify and pack for shipping as per PPP D350-748-101 Location: _____ PPP Rev: _____	0.00							
250 	QC21- Final Inspection - Work Order Release	0.00							
QC Quality Control	Memo	0.00							

SCRAP

W 12-04-22

Picklist Print

Tuesday, September 08, 2009 3:26:11 PM

Page 1

Work Order ID: 51889

Parent Item: D350-748-101RevD

Parent Item Name: Crosstube Installation, High Fwd

Comments:

Start Date: 9/9/2009

Required Date: 9/29/2009

Start Qty: 1.00

Required Qty: 1.00

Component Item ID/ Item Name	Replacement Item ID	Mfg/ Purch	Bin Item	Primary Location	Last Location	Route Seq ID	Unit of Measure	Qty on Hand	Remaining Qty To Pick	Qty Issued	Date Issued	Status
---------------------------------	------------------------	---------------	-------------	---------------------	------------------	-----------------	--------------------	----------------	--------------------------	---------------	----------------	--------

D350-748-101		Manufactured	No			110	Each	4.0000	1.0000			
--------------	--	--------------	----	--	--	-----	------	--------	--------	--	--	--

ALS4-1032-225



Crosstube Turning Detail



B-50625 MB 10-01-12

Warehouse Loc Qty Loc Code

Location

Main Warehouse

FG

4

37995

1

37999

40099

40103

200

Each

8,753.000

1.0000

ALS4-1032-225

Purchased

No



Insert



Warehouse

Loc Qty

Loc Code

Location

Main Warehouse

ST

8753

107441

16

110768

8737

Picklist Print

Tuesday, September 08, 2009 3:26:11 PM

Work Order ID: 51889



Parent Item: D350-748-101RevD



Parent Item Name: Crosstube Installation, High Fwd

Start Date: 9/9/2009

Required Date: 9/29/2009

Comments:

Start Qty: 1.00

Required Qty: 1.00

Component Item ID/ Item Name	Replacement Item ID	Mfg/ Purch	Bin Item	Primary Location	Last Location	Route Seq ID	Unit of Measure	Qty on Hand	Remaining Qty To Pick	Qty Issued	Date Issued	Status
AN960JD10 		Purchased	No			200	Each	2,309.000	1.0000			
Washer												

Warehouse Loc Qty Loc Code
Location

Main Warehouse

ST

2309

105442

95

109059

2

109840

23

110985

202

111279

13

111668

70

112314

1000

112369

904

D2856-400RevA

Manufactured

No

200

f

332.4577

1.2432



Abraison Strip

Warehouse Loc Qty Loc Code
Location

Main Warehouse

ST

122.8077

42437

44.93

46543

77.8777

Main Warehouse

ST403

209.65

50593

209.65

Picklist Print

Page 3

Tuesday, September 08, 2009 3:26:11 PM

Work Order ID: 51889



Parent Item: D350-748-101RevD



Parent Item Name: Crosstube Installation, High Fwd



Start Date: 9/9/2009

Required Date: 9/29/2009

Comments:

Start Qty: 1.00

Required Qty: 1.00

Component Item ID/ Item Name	Replacement Item ID	Mfg/ Purch	Bin Item	Primary Location	Last Location	Route Seq ID	Unit of Measure	Qty on Hand	Remaining Qty To Pick	Qty Issued	Date Issued	Status
D3500-1RevC		Manufactured	No			200	Each	17.0000	4.0000			
												
Saddle												

WarehouseLoc QtyLoc CodeLocation

Main Warehouse

ST

47119

47350

17

12

5

Each

43.0000

2.0000

D3502-1RevB

Manufactured No



Support

WarehouseLoc QtyLoc CodeLocation

Main Warehouse

ST

41603

42968

47120

5

2

2

1

Main Warehouse

ST168

50287

38

38

Tuesday, September 08, 2009 3:26:11 PM

Shop Packet Print

Page 3

Picklist Print

Page 4

Tuesday, September 08, 2009 3:26:11 PM

Work Order ID: 51889



Parent Item: D350-748-101RevD



Parent Item Name: Crosstube Installation, High Fwd


Start Date: 9/9/2009

Required Date: 9/29/2009

Comments:

Start Qty: 1.00

Required Qty: 1.00

Component Item ID/ Item Name	Replacement Item ID	Mfg/ Purch	Bin Item	Primary Location	Last Location	Route Seq ID	Unit of Measure	Qty on Hand	Remaining Qty To Pick	Qty Issued	Date Issued	Status
MS21920-20  Clamp (per MIL-DTL-8783C)		Purchased	No			200	Each	117.3000	2.0000			

Warehouse

Location

Main Warehouse

ST

103478

106484

109269

110536

111281

112307

Loc Qty

Loc Code

117.3

2

12

9.3

10

34

50

MS27039-1-10

Purchased

No

200

Each

37.0000 1.0000



Screw

Warehouse

Location

Main Warehouse

ST

111425

Loc Qty

37

37

Loc Code

Tuesday, September 08, 2009 3:26:11 PM

Shop Packet Print

Page 4

Picklist Print

Page 5

Tuesday, September 08, 2009 3:26:11 PM

Work Order ID: 51889



Parent Item: D350-748-101RevD



Parent Item Name: Crosstube Installation, High Fwd



Start Date: 9/9/2009

Required Date: 9/29/2009

Comments:

Start Qty: 1.00

Required Qty: 1.00

Component Item ID/ Item Name	Replacement Item ID	Mfg/ Purch	Bin Item	Primary Location	Last Location	Route Seq ID	Unit of Measure	Qty on Hand	Remaining Qty To Pick	Qty Issued	Date Issued	Status
AN4-41A  Bolt		Purchased	No			220	Each	142.0000	8.0000 			

Warehouse

Loc Qty

Loc Code

Location

Main Warehouse

ST

142

105940

4

110363

16

110731

50

111424

50

112082

22

AN4-6A

Purchased

No

220

Each

814.0000

16.0000


Bolt

Warehouse

Loc Qty

Loc Code

Location

Main Warehouse

ST

814

102602

3

105810

15

107534

1

109545

2

110399

27

111279

466

112314

300

Tuesday, September 08, 2009 3:26:11 PM

Shop Packet Print

Page 5

Picklist Print

Page 6

Tuesday, September 08, 2009 3:26:11 PM

Work Order ID: 51889



Parent Item: D350-748-101RevD



Parent Item Name: Crosstube Installation, High Fwd



Start Date: 9/9/2009

Required Date: 9/29/2009

Comments:

Start Qty: 1.00

Required Qty: 1.00

Component Item ID/ Item Name	Replacement Item ID	Mfg/ Purch	Bin Item	Primary Location	Last Location	Route Seq ID	Unit of Measure	Qty on Hand	Remaining Qty To Pick	Qty Issued	Date Issued	Status
AN5-32A 		Purchased	No			220	Each	79.0000	4.0000			
Bolt												

Warehouse

Location

Main Warehouse

ST

106242

106519

110363

111916

112082

Loc Qty

Loc Code

SCRAP

Picklist Print

Page 7

Tuesday, September 08, 2009 3:26:11 PM

Work Order ID: 51889



Parent Item: D350-748-101RevD



Parent Item Name: Crosstube Installation, High Fwd

Start Date: 9/9/2009

Required Date: 9/29/2009

Comments:

Start Qty: 1.00

Required Qty: 1.00

Component Item ID/ Item Name	Replacement Item ID	Mfg/ Purch	Bin Item	Primary Location	Last Location	Route Seq ID	Unit of Measure	Qty on Hand	Remaining Qty To Pick	Qty Issued	Date Issued	Status
AN960JD416		Purchased	No			220	Each	8,758.000	32.0000			

Washer

Warehouse

Loc Qty

Loc Code

Location

Main Warehouse

ST

102929

105906

107321

107939

108161

108827

109249

110523

111279

111916

112314

16941

8758
2
4
23
114
553
31
69
340
115
2620
4887
0

SCRAP

Picklist Print

Tuesday, September 08, 2009 3:26:11 PM

Work Order ID: 51889



Parent Item: D350-748-101RevD



Parent Item Name: Crosstube Installation, High Fwd

Start Date: 9/9/2009

Required Date: 9/29/2009

Comments:

Start Qty: 1.00

Required Qty: 1.00

Component Item ID/ Item Name	Replacement Item ID	Mfg/ Purch	Bin Item	Primary Location	Last Location	Route Seq ID	Unit of Measure	Qty on Hand	Remaining Qty To Pick	Qty Issued	Date Issued	Status
AN960JD516 		Purchased	No			220	Each	1,209.000	8.0000			
Washer												

Warehouse

Loc Qty

Loc Code

Location

Main Warehouse

ST

100564

106167

107534

107959

108246

108672

109059

109752

110363

110523

111279

112082

112314

1209

6

34

43

46

2

49

22

46

57

43

359

500

D3501-1RevA

Manufactured

No



Bushing

220

Each

423.0000

16.0000



Warehouse

Loc Qty

Loc Code

Location

Main Warehouse

ST

45402

45918

48268

423

19

200

204

Picklist Print

Tuesday, September 08, 2009 3:26:11 PM

Work Order ID: 51889



Parent Item: D350-748-101RevD



Parent Item Name: Crosstube Installation, High Fwd

Start Date: 9/9/2009

Required Date: 9/29/2009

Comments:

Start Qty: 1.00

Required Qty: 1.00

Component Item ID/ Item Name	Replacement Item ID	Mfg/ Purch	Bin Item	Primary Location	Last Location	Route Seq ID	Unit of Measure	Qty on Hand	Remaining Qty To Pick	Qty Issued	Date Issued	Status
---------------------------------	------------------------	---------------	-------------	---------------------	------------------	-----------------	--------------------	----------------	--------------------------	---------------	----------------	--------

MS21042L4

Purchased

No

220

Each

8,308.000

24.0000



Nut

Warehouse

Loc Qty

Loc Code

Location

Main Warehouse

ST

107499

110507

111827

112314

15924

8182

3308

266

3996

2000

0

41

220

Each

1337.000

4.0000

MS21042L5

Purchased

No



Nut

Warehouse

Loc Qty

Loc Code

Location

Main Warehouse

ST

110382

111636

112314

1337

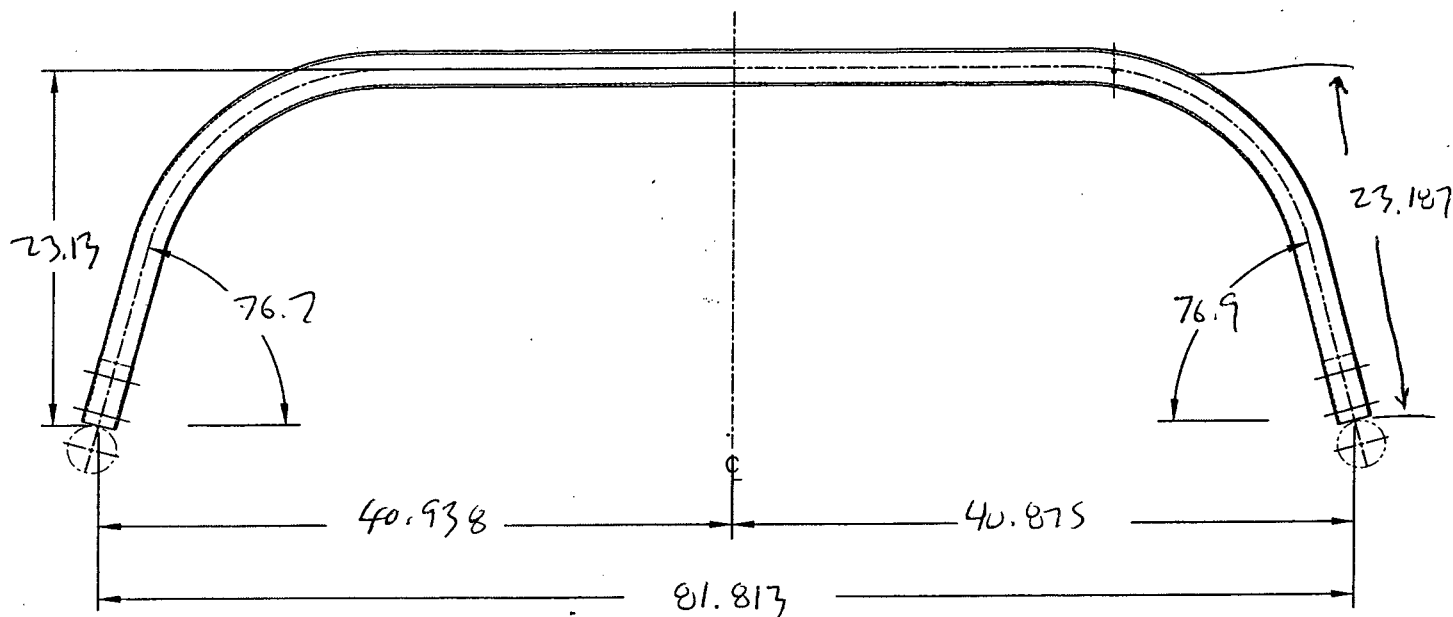
10

327

1000

DART AEROSPACE LTD		Work Order:	51889
Description: Crosstube High Fwd (AS350/355)		Part Number:	D350-748-101
Inspection Dwg: D350-748-141 Rev: D		Page 1 of 1	

Required Dimension	Min	Max
Height	23.13	23.37
1/2 Span	40.78	41.02
Angle	75	77
Total Span	81.56	82.04



Comments
Twist = 0.018"

QC15 Inspection	CP
Date	10.01.13

Rev	Date	Change	Revised by	Approved
A	07.02.06	New Issue	KJ/JM	

DART

DESIGN <i>qp</i>	DRAWN BY <i>qp</i>	DART AEROSPACE LTD HAWKESBURY, ONTARIO, CANADA	
CHECKED <i>HA</i>	APPROVED <i>HA</i>	DRAWING NO. D350-748-141	REV. D SHEET 1 OF 3
DATE 06.10.31		TITLE CROSSTUBE (AS 350/355 HI FWD)	SCALE NTS
A	06.03.31	NEW ISSUE	
B	06.06.30	ADD D6017-115 & PRIME AND PAINT	
C	06.08.14	ADD CAD PLATING	
D	06.10.31	MAG. PARTICLE AND CAD PLATE AS MFD.	

RELEASED

06.10.31 *HA*

QTY	P/N	DESCRIPTION
X	D350-748-141	CROSSTUBE ASSEMBLY (AS 350/355 HI FWD)
1	D6017-115	CROSSTUBE (OR D6015-125)
2	D3502-1	SUPPORT
2	D2856-400-710	ABRASION STRIP
1	AELS-1032-225	INSERT
1	AN960JD10	WASHER
2	MS21920-20	CLAMP (PER DART SPEC. M-MS21920-20)
1	MS27039-1-10	SCREW

UNDER REVIEW

09.02.05

PER PCR #09.001

D350-748-141 CROSSTUBE:

- 1) MATERIAL: MANUFACTURED FROM D6017-115 OR D6015-125
FINISHED LENGTH = 110.27±0.06
- 2) MACHINE PER MACHINING DETAIL ON PAGE 3. BLEND OUT ALL EDGES FROM MACHINING LONGITUDINALLY, TRANSITIONS SHOULD BE SMOOTH. NOTE: ALL HOLES ARE DRILLED AFTER BENDING.
- 3) SCRIBE DART PART NUMBER AND BATCH NUMBER IN THIS AREA WITH VIBRATING STYLUS
- 4) BEND PROGRESSIVELY WITH A MINIMUM OF 7 PASSES. MAXIMUM TUBE FLATTENING DUE TO BENDING IS 6% BASED ON O.D.
- 5) HEAT TREAT TO MIN. 180 KSI PER MIL-T-6736 OR AMS 2759-1C AFTER TURNING
- 6) FINISH: MAGNETIC PARTICLE INSPECT PER DART QSI 038 4.2
CADMIUM PLATE PER AMS-QQ-P-416B, CLASS 1, TYPE II
PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2
PAINT OUTSIDE PER DART QSI 005 4.2
- 7) EXTREME CARE MUST BE TAKEN TO PROTECT THE OUTSIDE SURFACE OF THE TUBE. THE OUTSIDE SURFACE MUST BE SMOOTH AND FREE FROM SURFACE DEFECTS SUCH AS SCRATCHES, NICKS, OR DENTS. DEFECTS UP TO 0.005" MAY BE BLENDED OUT LONGITUDINALLY. CIRCUMFERENTIAL GRIND MARKS ARE UNACCEPTABLE. WHEN DRILLING HOLES EXTREME CARE MUST BE TAKEN AND CAREFUL DEBURRING PERFORMED TO ENSURE A CLEAN HOLE WITH NO CRACKING/CHIPPING/GROOVES.
- 8) INSTALL D2856-400-710 ABRASION STRIP WITH A GAP ON BOTTOM SIDE OF CROSSTUBE, CENTERED OPPOSITE D3502-1 SUPPORT, PER QSI 035.
- 9) TORQUE MS21920-20 CLAMPS 60 TO 80 IN-LB
- 10) TOLERANCES ARE PER DART QSI 018 UNLESS OTHERWISE NOTED.
- 11) ALL DIMENSIONS ARE IN INCHES
- 12) PART IS SYMMETRIC ABOUT CENTERLINE EXCEPT FOR Ø0.297 HOLE.

UNDER REVIEW

OK 07.10.22

Copyright © 2006 by DART AEROSPACE LTD

THIS DOCUMENT IS PRIVATE AND CONFIDENTIAL AND IS SUPPLIED ON THE EXPRESS CONDITION THAT IT IS NOT TO BE USED FOR ANY PURPOSE OR COPIED OR COMMUNICATED TO ANY OTHER PERSON WITHOUT WRITTEN PERMISSION FROM DART AEROSPACE LTD.

